

## **Libraries 101 for International Students**

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#### Abstract

Academic libraries have been increasingly active in developing programs and services which allow their educational mission to address the needs of an increasingly more diverse student population. In addition to the pressures of adjusting to a new environment and to the educational demands of a new school, international students must also adjust to an extensive and sometimes overwhelming library system, which can be quite different from what they are used to. The organizational structure of libraries, their services, collections, even their role and mission can differ from a country to another, thus turning libraries into intimidating places, which can keep students away until the critical moment when a paper or report that could not be found by searching the internet is needed for a thesis or project.

By working closely with the academic departments and the administration of the School of Engineering and Applied Science (SEAS), the Engineering Library in collaboration with the science libraries at Princeton University has implemented a range of instructional and educational programs tailored for international students with the scope of fully integrating the library resources and services in the students' educational experience. Informally called "Libraries 101 for International Students" the initiative's goal is to help international students reach a level of knowledge and comfort with the services and collections of the Engineering Library and the Princeton University Library system in general, that will allow them to use the extensive research collections, both print and electronic, and draw on the expertise of the subject librarians and bibliographers who can provide insight into resources found beyond the long lists of results retrieved by the internet search engines.

#### The Outlook for Engineering Education

In her recent keynote address at DesignCon 2007, Leah Jamieson, the John A. Edwardson Dean of Engineering at the College of Engineering at Purdue University and the IEEE 2007 President and CEO, presented the engineering educators with a list of questions meant to instigate an introspective look at the challenges awaiting the current and future engineers<sup>1</sup>. In her address, Jamieson said: "We have to ask ourselves, will graduates have the attributes and skills that they need for careers over the next 40 years?" What makes this question even more thought provoking for engineering educators is the fact that according to some academic estimates, the half-life of engineering knowledge is between two to seven years, which means that by the time one graduates, half of what it was learned in the first years may or may not be relevant. One other factor educators need to take into consideration when designing their programs is the fact that new technologies requiring multidisciplinary skills are an integral part of the professional practice, and they must be continuously adopted, in addition to the inherent changes in the fields of engineering practice. In this ever-changing environment that demands a much greater emphasis on multi-disciplinary approaches to solving problems and challenges engineers to address global problems, educating engineers as lifelong learners is a crucial task.

In the context of mentoring lifelong learners at both graduate and undergraduate levels, the impetus for paying more attention to building information literacy and communication skills is growing, which makes academic libraries an important partner and supporter of the educational process. At Princeton University, all freshmen are introduced to library research tools from the first semester of enrollment, through writing seminars which incorporate a significant element of library research assignments. Graduate students attend library orientation sessions as part of their departmental orientations, where they are introduced to the library services available and the main resources, both print and electronic, specific to their field of study and research. While this type of services are considered standard and are offered to the entire

student population, regardless of their fields of study, they are not sufficient and may not always be tailored to address the information needs of international students.

Information and library science scholars have conducted studies about the information needs and information seeking behavior of international students and reported their findings in literature as early as 1986<sup>2</sup>. Most studies conducted in the 1990s attributed the lower usage rate of library resources and services by international students to a language and culture barrier and to the limited or non-existent exposure to a library system similar to the North American one in their own home countries (Mary Beth Allen 1993<sup>3</sup> and Nancy Moeckel and Jenny Presnell 1995<sup>4</sup>). A more recent study conducted by Yan Liao et al. 2007<sup>5</sup> at Virginia Tech in 2005 brings into focus the international graduate students' information-seeking behavior by highlighting its similarities and differences as compared with the information-seeking practices used by their American colleagues.

### International Students at Princeton University

As the latest "Open Doors" report suggests that international enrollments have stabilized and are poised to rebound<sup>6</sup>, the answers to the challenges faced by engineering education must take into consideration the needs of this significant student population. In 2005/06, the number of international students enrolled in U.S. higher education institutions remained steady at 564,766. A new analysis included in "Open Doors" for the first time shows colleges and universities reporting an 8% increase in new enrollments for 2005/06, with 142,923 newly enrolled students in Fall 2005, compared to 131,945 the previous Fall. The international student enrollment at Princeton University reflects the national trend and the figures reported over the past five years show a consistent increase in the percentage of undergraduate international enrollment, from 7.5% in academic year 2002/03 to 9.2% in 2006/07<sup>7</sup>. The international graduate student enrollment has decreased following the events of September 11, 2001, but the 2006/07 data shows that this decrease is stabilizing as the percentage of international graduate students remained at same level as for the academic year 2005/06, 38.6%. Historically, engineering departments have been hosts to large numbers of international students, especially in graduate programs. The School of Engineering and Applied Science (SEAS) at Princeton is not any different, as its graduate student enrollment shows that 55% of the admitted graduate students are international.

With the groundwork to address the specific needs of international students covered by the professional literature and equipped with the collective experience and observations of the professional library staff at Princeton University Library, the Engineering Library is coordinating a systematic program of educational activities specifically targeted to international students. The "Libraries 101 for International Students" program, in its current format, incorporates four elements: International Freshmen Students Orientation, Graduate Student Orientation, Course Integrated Teaching and International Student Center Activities. The activities carried under these four initiatives are meant to enhance the learning process, by assisting international students in locating, evaluating and retrieving the relevant information needed for research and study.

### International Freshmen Students Orientation

As part of the general freshmen orientation schedule, the library has always organized Open House events that gave students the opportunity to meet the library staff and get acquainted with the library services available. Despite widespread promotion and advertising of the library-sponsored events, it was found that the attendance to the orientation activities over the years has not increased dramatically and it stayed at a relatively low level (15% of freshmen population). Since reaching out to the entire freshmen population has proved to be challenging, isolating the international students in this situation was even more difficult. Obviously, another venue was needed, one that was assured to reach out to the international freshmen. This venue has been provided by the office of the Dean of Undergraduate

Students and International Student Advisor through the International Pre-Orientation program which is held each Fall in the week preceding freshman orientation. The scope of the program is to introduce international students and US students coming from abroad to the campus and to assist them with practical tasks such as buying items needed for the dorm rooms and opening bank accounts. In addition, they are introduced to other administrators and organizations on campus. Since 2005, the Library is one of the organizations which participate in the program every year with a formal presentation followed by a site seeing tour and visit to all campus libraries. This session is the first opportunity for representatives of the library staff to introduce themselves to the international undergraduate population and for the students to learn about the role that the library plays in the learning process. The librarians participating in this event have themselves been international students in US or in other countries, therefore they can very easily connect and relate to the students' experiences. Besides the general introduction to the library services and resources, the main part of the library presentation is to overview with the students a glossary of commonly used library terms. A study conducted by Liao et.al<sup>5</sup> in 2005 at Virginia Tech showed that 11% of the international students surveyed don't know what a reference librarian does, and 17.1% don't know what Interlibrary Loan is. Reviewing with the students a glossary of library terms explained in plain English has proved to be a valuable exercise, as the participants had the opportunity to hear the librarians explain in their own words what is the role of the reference librarian in an academic library, review some of the most common library transactions and specific services (such as BorrowDirect) that are commonly referred to in subsequent library sponsored events or in other interactions with library staff.

#### Engineering Graduate Student Orientation

SEAS hosts every Fall semester a full day orientation session for all new graduate students enrolled in programs from the six academic departments that form the School of Engineering and Applied Science. The highlight of the program is the address of the Dean of the School, followed by presentations by various student organizations and groups active on the campus. The Engineering Library is an active participant in this program of introduction to the campus life and the academic community and the day-long orientation concludes with a tour of the Engineering Library. This is a valuable opportunity for the library staff to present a 100 level crash course that covers all resources and services offered by the Engineering library. Located in the Friend Center for Engineering Education, the Engineering Library sets a national standard for the integration of print and electronic resources with classroom and study space, as well as being an attractive, welcoming, and functional facility. Through its physical layout (28,000 square feet distributed over three levels) and the type of resources it offers, the Library fosters the perfect environment for collaborative work, which is crucial in the engineering disciplines. The library offers extended hours all week long, being the only library on campus open until 2:00am on weekdays, which makes it the most popular study space on campus. The library collection is supported by a generous acquisitions budget which allows the collection to grow and acquire materials in various formats (print, online, CD/DVD, computer files). The journal collection is increasingly moving to an electronic format, which offers fast and easy access to users from any place within the university network or remotely. The Engineering Library maintains print subscriptions for 557 engineering journals, but SEAS users can access over 11,000 electronic journals and over 830 electronic databases from their desktops. Reference books and materials are also acquired predominantly in electronic format. In addition to the extensive electronic collection of resources, the Engineering library offers an electronic document delivery service to faculty, professional research and technical staff and graduate students, where articles and book chapters can be requested online and then delivered electronically to the users' desktop. There is a lot of information that all new students must assimilate during their orientation sessions, this is why the Library is very careful to emphasize the services that are most relevant to international students, namely the reference and individual consultation sessions and the interlibrary loan and document delivery service, since these types of services have been shown to be the ones most unfamiliar to international students<sup>5</sup>. The orientation and tour session are relatively short, but the interactions between the students and the staff members giving the tour are conducted in an informal set up, conducive to an open dialog where

questions can be asked despite any language or cultural barriers and connections can be formed that will lead to the likelihood that students will return and reach out to the familiar staff member with any questions or issues that may encounter during their years at Princeton University.

### Writing and Reading Scientific Literature for non-English Speakers

In 2005 SEAS established the Center for Innovation in Engineering Education (CIEE) with the mission to prepare all students, engineers and non-engineers “to be leaders in an increasingly complex, technology driven society”<sup>8</sup>. The Center has created new courses and revised some existing ones, with the goal of exposing students to real life problems that need to be solved from a multidisciplinary perspective. Besides courses such as “Engineering in the Modern World”, “High-Tech Entrepreneurship” and “Introduction to the Innovation Process”, students can enroll in “Reading and Writing About the Scientific Literature in English” (WSE-1) and “Writing an Effective Scientific Research Article”(WSE-2). WSE-1 is particularly designed to introduce non-native English speakers to reading and writing scientific literature by analyzing how successful scientists use the published literature as readers and writers. Both courses, WSE-1 and WSE-2 are being offered with the participation of the Princeton University Writing Program and they incorporate class time allocated to teaching literature searching and information evaluation skills. The course is only open to enrolled graduate students in their second year or above in a science or engineering discipline.

WSE-1 consists of several reading assignments, which are followed by writing assignments (several informal writings and one formal writing assignment in the form of a comprehensive literature review). The informal writings are posted to a message board and they are venues to express the readers’ uninhibited reactions and thoughts about the writing style and about the content by agreeing or disagreeing and by contributing their own experiences in relation to the aspects described by the literature. By carefully selecting the assigned readings for the first week of the course (“The Apprenticeship Approach to Advanced Academic Literacy: Graduate Student and Their Mentors” by Diane Belcher (1994)<sup>9</sup> and “Non-native graduate students’ thesis/dissertation writing in sciences: self-reports by students and their advisors from two U.S. institutions” by Yu Ren Dong (1998)<sup>10</sup>) the proper environment was created, and the 14 students enrolled in the Spring 2007 session brought forth candid testimonials about their own experiences as non-English speakers in the American academic world and as international students.

One common thread that emerged from the comments of the students to these readings was the agreement with the findings of the studies done by Belcher<sup>9</sup> and Dong<sup>10</sup>, which showed that international students tend to take less advantage of the resources available to them such as the library, labs, and other social networks and that they are less likely to ask for help or be open about their needs with their advisors or peers, unless they belonged to the same cultural group. From the international students’ perspective, it is much easier for domestic students to take advantage of these resources because they are so familiar with this education system. They have been trained to do so since the first day they entered the elementary school. But for international students, those resources might be totally new and even if they would know about them, they hesitate to try using them because of fear that it will not be done “in the right way”. International students have more limited social networks than domestic students and their information sources tend to be found by communicating with fellow students in their home countries. However, the class discussions generated by the papers by Belcher<sup>9</sup> and Dong<sup>10</sup> established very soon that in fact there is a significant difference between the social experiences of students from Asian countries and those from European countries, in the sense that students from Europe don’t share the same feeling of isolation as their colleagues from Asia and they tend to create larger social networks than Asian students.

Since the discussions about international students’ experiences occurred very early in the course timeline, the teaching faculty was able to co-opt the library’s assistance and to introduce in the course a component

of library research as a direct response to the students' declared lack of familiarity with the library resources at Princeton University. It was determined that the knowledge of the library system is very general, mostly limited to the aspects learned during the new graduate student orientation session. It was important that the library instruction introduced in the WSE-1 course be task oriented and that it would support the goal of the course, namely to read and write critically and effectively about scientific articles in the students' own area of research. By using the specific topics that the students chose to write about, the major tools for locating journal literature have been reviewed and discussed in detail.

Internet search engines are the preferred starting point for conducting literature searches, with Google, being the favorite. Very few students however were familiar with Google Scholar, the tool developed by Google to search and index scholarly publications, such as peer-reviewed papers, theses, preprints, abstracts, and technical reports from all disciplines of research. While search engines can be valuable tools to quickly locate some needed information, it was pointed out to the students that they don't help in conducting a comprehensive literature search.

One emphasis of the library training was to demonstrate the role of the reference tools, such as encyclopedias and dictionaries in the early stages of the research process, especially when there are interdisciplinary applications of the research that need to be addressed in the writing. Encyclopedias are useful places for non-native English speakers to familiarize themselves with the vocabulary of disciplines outside their main focus of research. Dictionaries are useful to identify correct uses and forms of words and synonyms that can then be used to construct search strategies in online indexes and databases. The McGraw Hill Encyclopedia of Science and Technology (AccessScience available by subscription at [www.accessscience.com](http://www.accessscience.com)) which integrates an encyclopedia and a dictionary in an easy to search interface was introduced to the class. The students didn't know about this resource, despite the fact that it is accessible through the library web site and the catalog same as all other library resources, but after hands-on demonstrations and a few searches on a topic of common interest, it received an enthusiastic assessment.

One resource familiar to all students is Web of Science (available by subscription at <http://isiknowledge.com/wos>), the web platform for searching the Science Citation Index, a standard research tool for scientists and engineers. Although all students have previously searched and used Web of Science, they were less familiar with some of the value-added features incorporated in the system, such as saving search strategies and creating automated e-mail notifications of new articles published and indexed in their own fields of research. Also unfamiliar to the students were the citation analysis and the EndNote Web citation management tools, both unique to Web of Science. The interest showed in the class in these features, have lead to further consultations and interactions between the teaching librarian and the students, held outside the class time.

One other major tool introduced during the class was Compendex (the online version of the Engineering Index available by subscription at <http://www.engineeringvillage2.org/>). Very few students were familiar with this resource and those who used it, same as in the case of Web of Science, were only familiar with the basic search features, and didn't pay attention to the value-added features such as limiting the search results by using the controlled vocabulary terms, identifying top publications for specific research areas or the current awareness capabilities.

Basic services such as Interlibrary Loan and Document Delivery have also been reviewed and any questions or apprehensions about how these services work have been addressed. The session has also provided the opportunity for the library staff to talk about what reference services are available and to demystify the concepts surrounding these services which are taken for granted by the US students, but they still are a mystery for the majority of international graduate students<sup>5</sup>.

## International Student Center Activities

Given the significant number of international students and visitors that the University is hosting at any time, a significant role in the campus life is played by the International Center, which provides a wide array of services to international students and visiting scholars. These services include practical help to adjust to the Princeton community, intercultural outreach events, and community building initiatives. English tutoring is a common activity that is offered with support from the Friends of the International Center, where a tutor meets with an international student or visiting scholar to practice English conversational skills. While libraries have usually been known for their quiet study spaces, modern libraries are offering extensive social spaces. The Engineering Library at Friend Center for Engineering Education is a modern, state of the art library that blends classroom and study spaces with comfortable and welcoming social spaces. This makes it a natural choice for English tutors to meet with their students for conversation practice. These visits give the library staff the opportunity to meet international students and scholars and to introduce them to the traditional services that we have to offer. Sometimes the English tutors themselves introduce their students to the library staff and encourage them to contact the library for research assistance and to take full advantage of the resources available.

By participating in the intercultural outreach events, the Engineering Library has established itself as an active supporter and partner of the International Center in its efforts to assist international students, thus giving the library more opportunities to promote its collections and services.

## Conclusion

The accelerated rate of technological change will continue to impact the information world with major implications for the educational process. In engineering education, the need to integrate analytical, design, and problem solving skills with the goal of cultivating lifelong learners, has been acknowledged and accepted, but this can not be fully accomplished without involving the academic libraries. It may be that many of the libraries will become virtual, with no physical items to browse, but this makes it even more critical that engineering students receive guidance and training to find their way in the increasingly complex digital world. For international students, this task is even more daunting. Despite the fact that the technological gap between countries may be closing in the context of the global economy, cultural and language differences will remain and international students will have to overcome them. Along with writing and communication skills, research skills and effective use of informational resources are highly desirable and necessary in the global market and integrating library programs such as those highlighted in this paper, can only enhance the learning process, by preparing international engineering students to efficiently navigate, locate, evaluate and retrieve the relevant information needed for research and study.

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